WHAT IS CLAIMED IS:

1. A rotor for a rotary electric machine, comprising:

a rotor core constructed of a helically wound material sheet, wherein

the material sheet is in a form of substantially belt and has a plurality of teeth extending from a first side of its middle portion and a plurality of projections projecting from a second side of the middle portion in a direction opposite to the teeth, the projections define recesses therebetween,

each projection and each recess have substantially the same dimension with respect to a centerline between a first line passing through tops of the projections and a second line passing through bottoms of the recesses, and

the material sheet is helically wound such that the projections are located at an inner diameter side of the rotor core.

2. The rotor according to claim 1, wherein the teeth have one of substantially trapezoidal shapes and substantially rectangular shapes.

3. The rotor according to claim 1, wherein

the material sheet is one of material sheets formed in a base sheet, and

in the base sheet the material sheets are arranged such that the projections of a first material sheet are substantially intermeshed with the projections of a second

material sheet.

4. The rotor according to claim 3, wherein the projections and the recesses of the first material sheet mate with the projections and the recesses of the second material sheet.

5. The rotor according to claim 3, wherein the projections of the first material sheet and the projections of the second material sheet have different areas with respect to the centerline.

6. The rotor according to claim 1, further comprising:

a rotor shaft fixed in the inner diameter of the rotor core, wherein

the projections of the material sheet forms arcs at the tops, the arcs having curvature substantially corresponding to a curvature of an outer circumference of the rotor shaft.

7. The rotor according to claim 1, wherein a dimension (H) of the teeth and a dimension (T) of the connecting portion and the projections with respect to a direction perpendicular to the longitudinal direction of the material sheet satisfy a relation $2 \times H \leq T$.

8. The rotor according to claim 1, further comprising:

conductors mounted in slots defined between the teeth, wherein

each of the teeth has nails projecting from its end in a substantially V-shape,

each of the nails have a dimension such that a distance between the nail of a first tooth and the nail of an adjacent second tooth in a circumferential direction of the rotor core is smaller than a width of the conductor mounted in the slot between the first tooth and the second tooth in a condition that the nails are bent toward the circumferential direction.

9. The rotor according to claim 1, further comprising:

an engaging means provided on the rotor core, wherein

the engaging means is disposed to restrict separation of sheet segments of the helically wound material sheet.

10. The rotor according to claim 9, wherein the engaging means is integrally formed into the rotor core.

11. The rotor according to claim 9, wherein the engaging means is formed within the projections of the material sheet.

12. The rotor according to claim 1, further comprising:

conductors mounted in slots defined between the teeth, wherein

the conductors have substantially U-shapes and are mounted such that the rotor core is sandwiched in an axial direction.

13. The rotor according to claim 1, wherein the projections are located on an inner diameter side of the rotor core and defines gaps between them in a circumferential direction of the rotor core.

14. The rotor according to claim 1, wherein the rotor core is used for a permanent magnet rotary electric machine.

15. A method of manufacturing a rotor of a rotary electric machine, comprising:

preparing a material sheet in a form of belt, wherein the material sheet has teeth extending from a first side of a middle portion of the material sheet and projections projecting from a second side of the middle portion in a direction opposite to the teeth, the projections define recesses therebetween, and each projection and each recess have substantially the same dimension with respect to a centerline between a first line passing through tops of the projections a second line passing through bottoms of the recesses; and

helically winding the material sheet such that the projections are located on an inner diameter side of a rotor core.

16. The method according to claim 15, wherein the material sheet is one of material sheets formed in a base sheet in a form of belt by stamping, and in the belt sheet a first

material sheet and a second material sheet are arranged such that the projections of the first sheet are substantially intermeshed with the projections of the second sheet.